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An Outbreak of *Cysticercus ovis* Condemnations from a Sheep Feedlot

Jocelyn Jansen, Veterinary Services Unit and Ab Rehmtulla, Veterinary Inspection and Audit Unit, OMAFRA; Paula Menzies, Andrew Peregrine and Elise Tatone, Ontario Veterinary College, University of Guelph

Lambs from an Ontario feedlot have experienced a high rate of condemnations due to *Cysticercus ovis* (*C. ovis*) since February 2008. The operation finishes 15,000 – 25,000 lambs per year. Lambs are sourced via a broker from western Canada, Quebec, Ontario and the USA. The majority of lambs come from the west and the USA. Most (90%) lambs are marketed at or before 60 days on feed. In 2007, a total of seven animals were condemned but none due to *C. ovis*.

Between February and May of 2008, approximately 140 animals have been condemned, almost all due to *C. ovis*. In groups of lambs shipped (roughly 100 per load), condemnation rates have reached 10 to 12%. At this time, only western Canadian sourced lambs appear to be affected. Identification of the tapeworm species was confirmed at the Animal Health Laboratory (AHL) and Ontario Veterinary College (OVC), University of Guelph, by scolex hook morphology and location of the cysts.

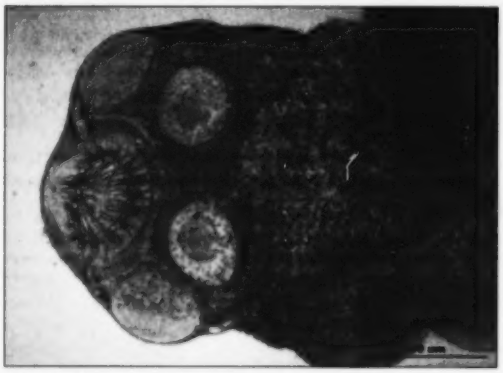

Figure 1. *C. ovis* scolex and four suckers recovered from a cyst. (*Photo courtesy of OVC.*)

C. ovis is the intermediate larval stage of the canid tapeworm, *Taenia ovis*. The adult tapeworm lives in the intestines of domestic dogs and wild canids (i.e. coyotes, foxes, wolves). Infections have been documented rarely in cats. Tapeworm segments, which contain thousands of eggs, are passed in the feces and contaminate the environment of sheep and goats. Eggs can survive in the environment for six to twelve months. Eggs are ingested by sheep or goats while grazing on pasture or while consuming contaminated stored feeds. Eggs hatch in the intestine; then the larvae penetrate the intestinal wall and are carried via the bloodstream to target tissues. Small (~5 mm x 9 mm), fluid-filled cysts develop. The most common sites to find cysts are the masseter muscles, heart, diaphragm and skeletal muscles. It is believed to take seven to ten weeks for a cyst to fully develop and become infective. If a dog eats raw sheep or goat tissues that contain cysts, the larval tapeworm will develop into an adult in the dog's intestine and the cycle will continue.

(Continued on page 3)

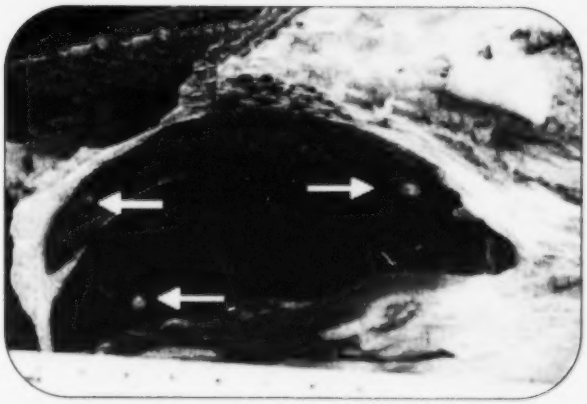

Figure 2. Muscle containing *C. ovis* cysts. (*Photo courtesy of AHL.*)

Cysticerci do not usually stimulate an inflammatory response in the intermediate host's tissues and are often detected at slaughter inspection. The disease is also known as "sheep measles". Cysts start out as clear, fluid-filled structures and over time degenerate. Dead cysts are seen as hard, caseous or calcified nodules in the muscle. *C. ovis* is neither a reportable nor a zoonotic disease in sheep or goats (unlike *Cysticercus bovis* in cattle). However, it is condemnable. Carcasses that are only lightly infected can be trimmed and passed for human consumption. Carcasses with four or more cysts located in four tissues are condemned.

Economic losses can be substantial.

The economic losses associated with this infection can be substantial to producers and buyers. Ontario has experienced sporadic outbreaks of *C. ovis* in feeder lambs over the past 15 years, but this winter the severity of the problem increased. There is also great concern that if the infection becomes established in wild canids in Ontario, the disease may be difficult to control.

Once a lamb is infected, there is no treatment that will remove the cysts. The most important control measure is deworming the dog (working, guard or pet) with a suitable cestocidal drug. Dogs should be dewormed **once a month** if cysts have been found in sheep carcasses. Anthelmintic treatments include: epsiprantel (Cestex*Tablets, 5.5 mg/kg), praziquantel (Droncit® or Drontal®, number of tablets based on body weight), fenbendazole (Panacur® Granules 22.2%, 50 mg/kg daily for three consecutive days), or nitroscanate (Lopatol® Tablets, number of tablets based on body weight). Additional preventative measures include not feeding raw sheep meat to dogs. Also, sheep meat can be frozen at -18°C for 10 days or cooked thoroughly at 56°C to destroy tapeworms in cysts. Producers should also ensure that all deadstock is disposed of properly on-farm (buried under two feet of soil, composted to prevent scavenging). In this case, the feedlot owner has requested that the broker maintain national sheep identification tag numbers so that source flocks can be notified of the problem and take appropriate action to prevent further infections.

1. *Taylor MA. Coop RL, Wall RL. Veterinary Parasitology, 3rd ed. Ames, Iowa: Blackwell Publishing, 2007:381-382.*
2. *Manual on Meat Inspection for Developing Countries. Food and Agriculture Organization of the United Nations, 2000. www.fao.org/docrep/003/t0756e/T0756E00.HTM*
3. *Taenia Infections. Center for Food Security and Public Health, 2005. www.cfsph.iastate.edu/Factsheets/pdfs/taenia.pdf*
4. *The Impact of Dog Tapeworms on your Sheep. Alberta Sheep & Wool Commission, 2007. www.absheep.com/documents/TheImpactofDogTapeworms.pdf*

Attention: Small Ruminant Practitioners

Jocelyn Jansen and Kathy Zurbrigg, Veterinary Services Unit, OMAFRA

The small ruminant industry in Ontario is growing. There is a need to establish effective relationships between veterinarians and small ruminant producers to ensure prompt attention and monitoring of endemic and emerging diseases, as well as foreign animal diseases. Improved research and education are needed to prepare practitioners and producers for industry growth.

The Veterinary Services Unit would like to survey practitioners regarding their small ruminant needs (caseload, desired extension materials), interest in the creation of sentinel practices to collect current morbidity/mortality information, and interest in forming an Ontario Association of Small Ruminant Practitioners. The survey will be very brief (1 page) and mailed out to clinics this summer.

If you have any questions, please contact Jocelyn Jansen at (519) 846-3414 or Kathy Zurbrigg at (519) 846-3418.

A Comparison of the Sheep and Cattle National Identification Programs

France Lanthier and Jennifer Fleming-MacTavish, Canadian Sheep Federation
Paul Stiles, Ontario Cattlemen's Association

Item	Sheep	Cattle
Is animal identification mandatory?	Yes. Since January 1, 2004, all sheep leaving their farm of origin (temporarily or permanently) must be identified with a Canadian Sheep Identification Program (CSIP) ear tag.	Yes. As of July 1, 2001, all cattle permanently leaving from any point beyond their herd of origin had to be tagged. As of June 29, 2005, all cattle leaving their herd temporarily or permanently must be identified.
Are RFID tags mandatory?	No, except in the province of Quebec. Animals being shipped into Quebec must be identified with an Allflex RFID tag.	Yes. Canadian Cattle Identification Agency (CCIA) policy states that, as of September 1, 2006, all cattle leaving their farm of origin must be tagged with a CCIA approved RFID tag. CCIA approved bar code tags are still considered "approved tags" and, as such, can still be used. Bar code tags should only be used on mature cows and bulls. A date of December 31, 2009, has been established as the end date for bar code tags.
What are the approved tags?	There are three tag options: • Pink steel Ketchum Kurl-Lock # 3 • Pink Allflex dangle tag • Yellow Allflex RFID tag (PLUS either a pink Ketchum tag or an Allflex dangle pink or yellow tag if going to Quebec)	There are six CCIA approved RFID tags available: • Allflex FDX • Allflex HDX • Destron Fearing etag FDX • Reyflex • Y-Tex TechStar II tag FDX • Zee Tags
How do animals enter the database?	The numbers are assigned to tag manufacturers and tags are distributed through authorized distributors. The distribution centers maintain records of which numbers went to which producers. This information is reported to a central database maintained by the CCIA.	The numbers are assigned to tag manufacturers and tags are distributed through authorized distributors. The distribution centers maintain records of which numbers went to which producers and must report tag sales to CCIA within 24 hours of sale. This information is reported to a central database maintained by the CCIA.
What records are producers required to keep?	Producers are required to keep records of all sheep and lambs entering their farm for breeding purposes and all sheep 18 months and older leaving their farm to a destination other than a provincially or federally inspected abattoir. ***Records are not required*** *for sheep not used for breeding purposes and animals less than 18 months leaving the farm (i.e. feeder lambs entering feedlots)* **	There are no record keeping requirements; however, it is recommended that records of the ID number of re-tagged animals (i.e. animals who have lost tags) should be kept along with any known information of where they came from.

(Continued on page 5)

Item	Sheep	Cattle
What does the producer do if a tag falls out or has to be replaced?	If a tag falls out or must be replaced while the animal is still in the flock of origin, the new tag can simply be applied. No record keeping is required; however, it is recommended. If a tag falls out or must be replaced in an animal that is no longer in the flock of origin, the new tag is applied and a record must be kept of the original tag number and the replacement tag number.	If an animal previously tagged with a CCIA-approved tag must be re-tagged, the CCIA requires notification of the cross-reference numbers, if possible. In cases where tags were lost and no cross-reference information is available, an approved CCIA tag must be applied as soon as possible by the current owner.
Are tags retired once the animal is slaughtered?	No. The tags are left on the animal until the point of carcass inspection or until the animal has been approved for human consumption at the abattoir. The tags are not retired at the slaughterhouse, that is tag numbers from slaughtered animals are not recorded and reported to the CCIA.	Yes. Abattoirs are required to record and report any CCIA tag numbers on cattle coming through their premise. This is required under the National Identification Regulations of the *Federal Health of Animals Act*. Even deadstock leaving the farm must have an approved CCIA tag applied. The onus is on the deadstock collector to retire the tag.

Recently the Canadian Sheep Federation Board of Directors passed a motion ***highly recommending* **all producers to keep records on all animals leaving their flock, recording their date shipped, tag numbers and destination.**

Frost-free and Free-access - Milk Bars at Winding River Farms

Neil Anderson, Veterinary Services Unit, OMAFRA

At Winding River Farms, Stewiacke, NS, the Vissers and Harbers designed a warm box to facilitate free-access feeding of acidified milk in a cold barn. In operation since late January 2008, their design keeps the chill off milk, prevents nipples from freezing, and agitates milk at regular intervals.

At the time of my visit in March, three pens were set up with warm-box milk bars. The first group of calves were in the weaning phase. Each pen held five to six calves with an area of 45 square feet per calf. Prior to this conversion, the ex-heifer-barn housed calves individually in hutches. Curtain walls, sliding doors and an open ridge provide ventilation.

Figure 1. A calf nurses from a nipple recessed within a warm-box. On the opposite side, a full-size door provides easy access to the interior. One plug connects the electrical components.

- The milk bar includes three nipples mounted at calf-shoulder height.

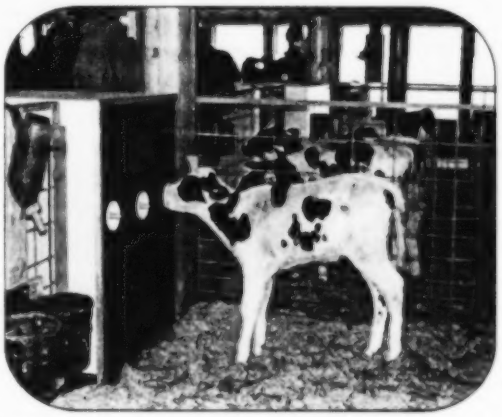

Figure 1

- Plastic coated plywood forms the wall for the milk bar.
- Four-inch PVC end caps serve as mounts for nipples.
- End caps fit flush with the outer wall, recess inside the warm box, and are bathed in warm air.
- Warm end caps radiate heat around the nipples. Although it was not necessary, holes could be drilled in the end caps to allow warm air to escape around the nipples.

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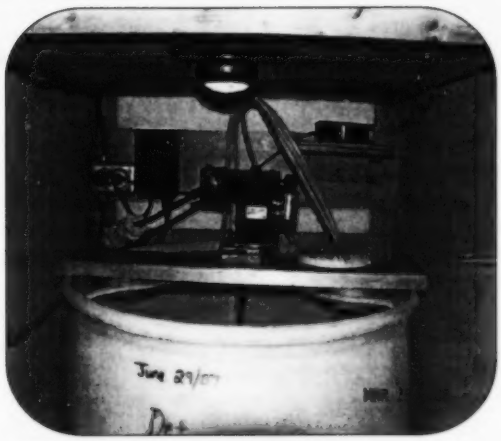

Figure 2

Figure 2. The interior of the warm box provides space for a 200 L barrel, nipple bar, mixer, timer, heater, fan, light and thermometer.

- A 300-watt baseboard heater keeps the interior of the box and the milk at about 20°C.
- Styrofoam insulates the box for heat retention.
- A small fan mixes air inside the box for even heat distribution.
- A metal heat shield between the heater and barrel protects the milk from overheating.
- A 1/20-HP Dayton AC Gearmotor (model 1LPV1) turns the mixer at about 100 rpm.
- A timer starts and stops the mixer every hour for a short agitation cycle.
- The agitator is a stainless rod with two stainless paddles. It attaches to the motor's 5/16-inch shaft with rubber tubing and stainless hose clamps.
- Milk lines feed through a plastic conduit within the barrel so they do not tangle with the agitator.
- A light and thermometer complete the equipment list.
- Electrical plugs permit easy removal of the barrel for cleaning or moving the warm-box milk bar.
- To remove the barrel, unplug the power source for the agitator-motor and disconnect the milk lines from the nipples.

The warm box milk-bars were a team effort at Winding River Farms. Dr. Frank Schenkels provided encouragement for the project. Uncle Jack, a retired engineer, designed the system and solved challenges of freezing nipples, keeping the chill off milk, regular agitation and simplicity of maintenance. Family members sourced materials and assembled the warm boxes. The concept of nipple bars recessed into a warm-air duct may be a solution for a milk line within cold (below freezing) calf barns.

When told that others could benefit from their ideas, Uncle Jack and the Vissers and Harbers families very generously provided a materials list and drawings and gave permission to provide their plans to producers and their advisors. Plans will be available on the Ontario Association of Bovine Practitioners website at *www.oabp.ca* in the **Ceptor** newsletter section. Alternatively, you may contact me directly – neil.anderson@ontario.ca or (519) 846-3410.

Heat Exchangers are Useful for Free-access Calf Feeding

Neil Anderson, Veterinary Services Unit, OMAFRA

In a heat exchanger, a fluid flowing through a pipe exchanges heat with another fluid flowing through an annulus surrounding the pipe. In a counter-flow heat exchanger, fluids flow in the opposite direction. A heat exchanger can warm milk to 20°C for feeding calves. It also can cool fresh whole milk to 15-20°C before adding formic acid.

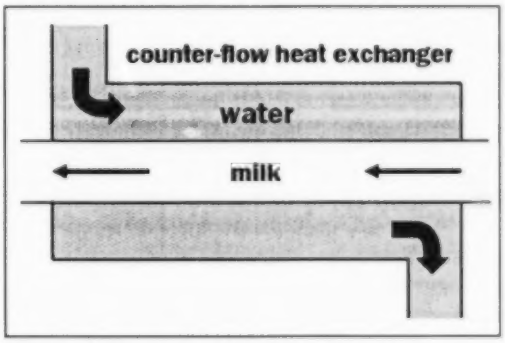

Figure 1. A counter-flow heat exchanger.

Two producers near Elginfield, Ontario, have milk lines for feeding calves in cold barns. They use a heat exchanger to take the chill off acidified milk

(Continued on page 7)

returning to a milk-storage tank. A temperature probe, located near the pump, senses milk temperature in the line going to the nipples. When the milk temperature drops below 20°C, a thermostat starts a pump that circulates hot water through the heat exchanger. Their heat exchangers varied in length and were made locally using one-inch stainless steel pipe inside two-inch stainless pipe. One producer had a 6-foot-long heat exchanger. However, in his cold barn with about 150 feet of un-insulated, plastic milk line, he now would opt for a 10-foot version.

New Provisions for Non-Emergency Slaughter of Food Animals on Producer Premises

Adapted from the April 2008 OMAFRA Infosheets by Kathy Zurbrigg, Veterinary Services Unit, OMAFRA

Ontario's Meat Regulation (O. Reg 31/05 under the *Food Safety and Quality Act*, 2001) has been changed to provide options for cattle and pig producers who want to slaughter animals on their farm and have carcasses processed off the farm. An examiner certified for non-emergency, on-farm slaughter must provide ante mortem and post mortem examinations and ensure humane animal handling and sanitary dressing. Either the certified examiner or the producer, under the supervision of the certified examiner, may conduct the stunning, slaughter and dressing processes.

The processing must occur in a provincially licensed slaughter plant or provincially licensed free-standing meat plant. The products can only be consumed by the producer and their immediate family on the premises where the animal was slaughtered. Products cannot be sold, shared, donated or distributed. Producers can still slaughter and process carcasses on farm without the supervision or use of an examiner if the meat is not going to leave the premises and is consumed only by the producer and their immediate family.

Producers are responsible for verifying the availability of their selected plant, as plants are only allowed to accept on-farm slaughtered carcasses up to a total of 16 weeks per year. This includes a maximum of four weeks during the spring period (March 1 to April 30) and a maximum of 12 weeks during the fall period (September 1 to December 31).

For further details on this new regulation, information required to participate, or information on how to become a certified non-emergency, on-farm examiner, please refer to the complete OMAFRA Infosheets. These can be found at: *www.omafra.gov.on.ca/english/food/inspection/fs_food_animal.htm* under "New Provisions for Non-Emergency, On-Farm Slaughter."

The Campbell Centre for the Study of Animal Welfare
invites you to listen to

Dr. Temple Grandin
of Colorado State University

Decision Making During Transport, Sale and Slaughter - The Role of Animal Welfare and the Veterinarian

June 18, 2008, 7:00 p.m.
Room 1714, Lifetime Learning Centre
Ontario Veterinary College

The handling of livestock for sale and slaughter is increasingly drawing attention because of implications for food safety and animal welfare. Veterinarians play a key role and must often make tough decisions regarding animal fitness for transport, sale or slaughter. Improved animal welfare can be achieved through a better understanding and open discussion of the animal behaviour that is indicative of pain and stress.

Caring for Compromised Cows – Making a Responsible Decision

Mike Draper and Penny Lawlis, Veterinary Inspection and Audit Unit, OMAFRA

With the recent closure of Gencor Foods Inc. on April 1, 2008, local options for shipping cull cows have become very limited. Producers need to exercise extra thought in determining whether cull cows can be shipped to livestock auctions in Ontario, whether they should be further treated or potentially euthanized on farm. Other options include slaughtering the cow on farm for family consumption or having the animal processed at a local provincial abattoir.

Veterinarians are asked to remind their dairy and beef-cattle clients to be careful when it comes to the care and transport of their cull animals. Cull cows may be in transit for up to seven days from the time they leave the farm until the time they are slaughtered. The producer needs to ensure the cow is fit for a potential extended stay at a sales barn and long trip on a livestock truck. The majority of cull animals are now being transported out of province for slaughter and a significant number of cull cows are being exported to the United States.

In Ontario, livestock community sales are regulated by the Ontario Ministry of Agriculture, Food and Rural Affairs (OMAFRA) under the authority of the *Livestock Community Sales Act*. The *Decision Tree* and *Caring for Compromised Cattle* documents, prepared by the Ontario Farm Animal Council (OFAC), are issued by OMAFRA to assist sales barn lay inspectors and OMAFRA Appointed Veterinarians in determining the disposition of cattle at licensed livestock community sales. Livestock found unsuitable for transportation or sale may be euthanized or ordered returned to the consignor for treatment.

Copies of the *Decision Tree* or the *Caring for Compromised Cattle* documents are available by calling the Ontario Farm Animal Council office at (519) 837-1326. They can also be downloaded from the OFAC website at *www.ofac.org/issues/animal_resources.php*

For further information regarding the Livestock Community Sales Program, please contact Mike Draper, *Livestock Community Sales Act* Coordinator at (519) 537-2032.

Abrasive Floors Impair Weight-bearing of the Claw Wall

Neil Anderson, Veterinary Services Unit, OMAFRA

For solid floors in free-stall dairy barns, producers may choose broom-finished concrete, 'jitterbug' finished concrete, stamped concrete, rubber over concrete, or a combination. Slipping may be less common on abrasive surfaces. However, on some farms, abrasive concrete has worn away claw walls and soles, and crippled cows. Ideally, a floor should preserve, rather than harm, the normal weight-bearing structures of the claw. Recently, Evengi Telezhenko provided useful information to help those considering abrasive surfaces, rubber, or concrete floors.

Telezhenko measured weight and pressure distribution on claws of cows kept on four floor types described in the text for **Figure 1**.

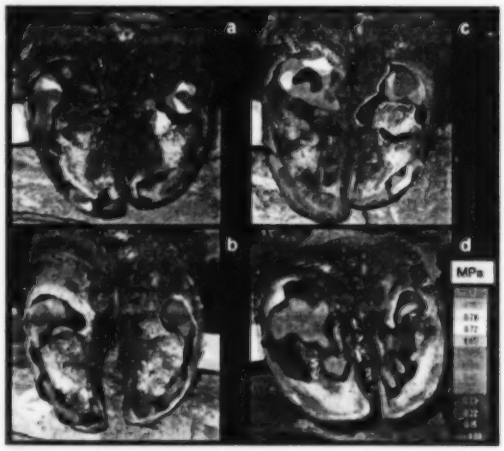

Figure 1. Results of color-coded output of I-Scan (Tekscan Inc.) matched with claw images in Swedish Holstein cows kept in different flooring systems: a) low abrasive concrete slatted floor; b) rubber mats (KURA-S, Kraiburg); c) mastic asphalt floor with feed-stalls; d) mastic asphalt floor without feed-stalls. Color figure available online from (*http://jds.fass.org/content/vol91/issue5/*). Click on reference.

(Continued on page 9)

Abrasive mastic asphalt flooring significantly reduced the role of the most important weight-bearing structure, the claw wall. Exposure to low-abrasive concrete floors transferred weight toward the bulb region. Soft, rubber flooring preserved the claw wall as a weight-bearing surface.

Telezhenko recommends a rubber floor plus short-term exposure to an abrasive surface to provide wear and claw shape. His findings and recommendation supports the choice of some Ontario producers who have both in their new barns.

Telezhenko E, Bergsten C, Magnusson M, Ventorp M, Nilsson C. Effect of different flooring systems on weight and pressure distribution on claws of dairy cows. J Dairy Sci 2008; 91(5):1874-1884.

What to Expect after Putting Rubber on Slatted Floors

Neil Anderson, Veterinary Services Unit, OMAFRA

Advertisements for a slat-rubber-system are sparking interest in modifying existing or new concrete slats in dairy barns. It is timely, then, to consider a recent paper by Siegfried Platz and colleagues. Their paper describes floor-associated cow behaviour on concrete slatted flooring and in the same barn after the floors were covered with perforated rubber. They used Type Kura S mats from Gummiwerke Kraiburg, Tittmoning, Germany. Their observations about desirable and undesirable outcomes are worth knowing when considering rubber for concrete slatted floors.

Using video recordings, Platz analyzed estrus (mounting) and hygiene behaviour (licking while standing on three legs and caudal licking) within a herd of 50 Brown Swiss dairy cows in free-stall housing. Platz also assessed step length and number of steps, representing walking behaviour, using still photographs and pedometers. Step length (58 ± 1 vs. 70 ± 1 cm; n = 35; $p<0.01$) (mean ± SEM) and steps per day (4,226 ± 450 vs. 5,611 ± 495; n = 9; $p<0.01$)) were greater on the rubber-coated slatted floor than the concrete slatted floor.

Mounting behaviour was more frequent on the rubber-covered floor (23 vs. 112; $p<0.01$).

Figure 1. This cow chose perforated rubber floor for walking in the transfer lane to the milking parlor. (*Photo courtesy S. Platz*)

Collapsing or slipping occurred during 19 of 23 mounting actions on the concrete slatted flooring whereas there were no similar events on the rubber-covered floor. (The researchers found no statistical difference.) After installing the rubber, there was a four-fold (105 vs. 511 observations) increase in licking while standing on three legs and caudal licking. Daily frequency of licking while standing on three legs (6.9±1.3 vs. 26.9±2.4) or caudal licking (3.6±0.8 vs. 24.2±3.5) was more common on the rubber-covered than the concrete slatted floor ($p<0.01$). Resting in the alley increased from 6.0±1.8 on the concrete slatted floor to 72.2±4.5 observations per day on the rubber-covered floor ($p<0.01$).

Platz offered the cows both floor surfaces in the transfer alley to the parlor and alternated the sides during his trial (**Figure 1**). Whenever the animals had a choice between a concrete or rubber surface, two-thirds of the cows chose the rubber surface ($P < 0.01$) and fewer cows changed sides during the walk ($P < 0.01$). When the surfaces of both sides of the walkway were the same, no preference in use was observed, and crossing of sides occurred more often ($P < 0.01$).

Since the Kraiburg rubber differs from slat rubber systems offered by other companies, the reader should be cautious about extrapolation of Platz's findings to other brands. Alley-resting may indicate discomfort in stalls and should alert us to improving other areas to avoid creation of new hazards.

(Continued on page 10)

Producers may consider perforated rubber floors for ease of heat detection, walking, and traction for normal grooming behaviours.

Platz S, Ahrens F, Bendel J, Meyer HHD, Erhard MH. What happens with cow behavior when replacing concrete slatted floor by rubber coating: a case study. J Dairy Sci 2008; 91(3):999-1004.

Potential Impact of Wildlife Reservoirs of *Mycobacterium Avium Paratuberculosis*

Kelli Pinner, Summer Student, Veterinary Services Unit, OMAFRA

Research in Scotland and in the United States has shown that many wildlife species may be carrying *Mycobacterium avium paratuberculosis* (MAP) and pose an unknown risk to domestic livestock. Domestic livestock may come in contact with wildlife when grazing or consuming feed contaminated with feces. In Scotland, rabbits have been found with the lesions associated with MAP infection. In the UK, there appears to be a link between the persistence of Johne's disease among domestic ruminants and the infected rabbit population. It is likely that rabbits become infected when consuming vegetation contaminated by domestic ruminants. Rabbits are capable of shedding the bacteria in their feces and rabbit isolates of MAP have been experimentally shown to cause infection in calves. MAP is shed in rabbit feces in high enough amounts that, theoretically, ingestion of just one or two fecal pellets could be an infective dose for a calf. In Scotland, populations of rabbits have been shown to contaminate pastures with 7,357 fecal pellets/ha/day, and it appears cattle do not avoid grazing pellet contaminated areas.

Rodents caught in buildings housing animals have been shown to carry MAP, while rodents in adjacent outdoor areas were negative. The rodents likely became infected when scavenging feed contaminated with fecal matter. Rodent fecal matter may be ingested when livestock feeds are contaminated and this may be a potential mode of transmission. However, the prevalence of MAP infection in rodents is low compared to the prevalence in rabbits and their predators.

Predators that consume infected rabbits or rodents may become infected. Feral cats, coyotes, skunks, opossums, raccoons, red foxes, weasels, stoats, corvids (crow family) and other carrion-eating birds have all tested positive for MAP. While feral cats were found to carry the bacteria, clinical lesions were not observed and few colonies were isolated from mesenteric lymph nodes and ileum. Researchers suggest shedding is minimal and cats may be a dead-end host. However, more research is required to confirm the epidemiologic significance of infected feral cats. It is unlikely that livestock will come in contact with large quantities of feces from infected carnivores; however, corvids and other infected birds may be a potential source of infection, as there may be large populations leading to significant contamination of livestock feeds.

Wildlife may serve as a vehicle for transmission of bacteria from one farm to another. Predators may have a range that encompasses multiple farms, and birds may transport MAP for great distances. Deer are also a species that may have a significant role in disease transmission between farms, as they may become infected and may shed MAP in high amounts. Deer cover large distances that may also encompass multiple farms.

While there appears to be a higher risk of transmission of disease from domestic livestock to wildlife than vice versa, the risk of transmission from wildlife to livestock is of unknown significance at this time. Prevention of exposure of wildlife to manure from MAP infected livestock would be prudent in preventing the spread of infection beyond the farm.

1. *Anderson JL et al. Mycobacterium avium subsp. paratuberculosis in scavenging mammals in Wisconsin. J Wildl Dis 2007; 43:302–308.*
2. *Beard PM et al. Paratuberculosis infection of nonruminant wildlife in Scotland. J Clin Microbio 2001; 39:1517-1521.*
3. *Beard PM et al. Experimental paratuberculosis in calves following inoculation with a rabbit isolate of Mycobacterium avium subsp. paratuberculosis. J Clin Microbiol 2001; 39:3080–3084.*
4. *Daniels MJ et al. Do non-ruminant wildlife pose a risk of paratuberculosis to domestic livestock and vice versa in Scotland? J Wildl Dis 2003; 39:10–15.*
5. *Judge J, Kyriazakis I, Greig A, Davidson RS, Hutchings MR. Clustering of Mycobacterium avium subsp. paratuberculosis in rabbits and the environment: how hot is a hot spot? Appl Environ Microbiol 2005; 71:6033-6038.*

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6. *Palmer MV, Stoffregen WC, Carpenter JG, Stabel JR. Isolation of Mycobacterium avium subsp paratuberculosis (MAP) from feral cats on a dairy farm with Map-infected cattle. J Wildl Dis 2005; 41:629–635.*
7. *Raizman EA, Wells SJ, Jordan PA, Del Giudice GD, Bey RR. Mycobacterium avium subsp. paratuberculosis from free-ranging deer and rabbits surrounding Minnesota dairy herds. Can J Vet Res 2005; 69:32-38.*

Mechanical Transport and Transmission of *Cryptosporidium Parvum* Oocysts by Wild Filth Flies (Abstract)

Submitted by Ann Godkin, Veterinary Services Unit, OMAFRA

Over the course of six months, wild filth flies were collected from traps left for 7-10 days in a barn with or without a calf shedding *Cryptosporidium parvum* Genotype 2 oocysts in diarrheic feces. The oocysts of *C. parvum* transported on the flies' exoskeletons and eluted from their droplets left on visited surfaces were infectious for mice. The mean number of oocysts carried by a fly varied from 4 to 131, and the total oocyst number per collection varied from 56 to approximately 4.56 x 10^3.

Fly abundance and intensity of mechanical transmission of infectious *C. parvum* oocysts were positively correlated, and both increased significantly when an infected calf was in the barn. Molecular data showed that the oocysts shed by infected calves were carried by flies for at least three weeks.

Filth flies can acquire infectious *C. parvum* oocysts from unsanitary sites, deposit them on visited surfaces and, therefore, may be involved in human or animal cryptosporidiosis.

Graczyk TK, Fayer R, Knight R, Mhangami-Ruwende B, Trout JM, Da Silva AJ, Pieniazek NJ. Mechanical transport and transmission of Cryptosporidium parvum oocysts by wild filth flies Am J Trop Med Hyg 2000 Sept-Oct; 63(3-4):178-183.

High Prevalence of Bovine Papillomaviral DNA in the Normal Skin of Equine Sarcoid-Affected and Healthy Horses (Abstract)

Submitted by Ann Godkin, Veterinary Services Unit, OMAFRA

Bovine papillomavirus (BPV), the causative agent of papillomas in cattle, has been shown to play a major role in the pathogenesis of equine sarcoids in horses. BPV has also been detected occasionally in normal equine skin.

In this study, presence and activity of BPV in normal skin and peripheral blood of four groups of horses were evaluated: sarcoid-affected horses, horses living in contact with sarcoid-affected horses, horses living in contact with papilloma-affected cattle and control horses. From each horse, three samples on four locations were collected: a swab of the intact skin surface and both a swab and a biopsy after decontamination.

BPV DNA was found in the normal skin of 24 of 42 horses (57%). Mainly sarcoid-affected horses and horses living in contact with cattle were carriers (73%), but BPV DNA was also detected in 50% of the horses living in contact with sarcoid-affected horses and in 30% of the control population. BPV mRNA was detected in 58% of the samples positive for BPV DNA, although in a much lower quantity compared to sarcoids. In most of the BPV DNA-positive samples, mild acanthosis, slight basophilic cytoplasmic swelling of the epidermal layers and/or thickening of the basal membrane were noticed, but these observations were also present in several BPV DNA-negative normal skin samples. BPV DNA could not be detected in peripheral blood.

These findings suggest latent infection and a widespread occurrence of BPV in the horse population.

Bogaerts L, Martens A, Van Poucke M, Ducatelle R, De Cocker H, Deprez P, Dewulf J, De Baere C, Peelman L, Gasthuys F. High prevalence of bovine papillomaviral DNA in the normal skin of equine sarcoid-affected and healthy horses. Vet Micro 2008; 129 (1-2):58-68.

Real-Time PCR for the Identification and Differentiation of Neuropathogenic Strains of *Equid Herpesvirus 1* (EHV-1)

Reprint of notice from AHL Labnote Number 16, April 2008, Animal Health Laboratory (AHL), University of Guelph

The AHL is now offering a real-time PCR for the identification of EHV-1. This PCR differentiates between neuropathogenic and non-neuropathogenic strains of EHV-1.

Live animal samples for testing should be either 20 mL of EDTA blood or a nasal swab. The nasal mucosa should be swabbed aggressively to ensure that cells are retrieved and not just nasal debris. Acceptable swabs are an untreated cotton swab broken off in 1/2mL of saline or swabs in transport media for viruses (e.g., Starplex Multitrans Collection and Transport System VWR Cat# CA73270-008).

Testing is also possible on any tissue involved in the pathogenesis of disease for cases presented for post mortem. This includes brain or spinal cord from neurological cases, lung from animals with neonatal pneumonia and fetal tissues from abortions. When selecting fetal tissues, include thymus, lung, liver, spleen, adrenal and placenta. Tissues from the same animal will be pooled.

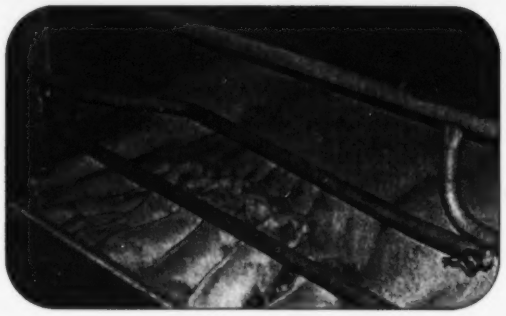
The charge is $65 per test; this includes strain differentiation. All samples should be shipped refrigerated. For more specific test-related information, please contact Dr. Suzy Carman, phone (519) 824-4120 ext 54551 or e-mail scarman@lsd.uoguelph.ca

Littersize—Costs and Benefits of Getting it Right

Tim Blackwell, Veterinary Services Unit, OMAFRA

Outbreaks of disease cause dramatic decreases in reproductive performance. However, equally damaging reproductive losses occur on many Ontario swine farms year after year without comment.

Advances in the use of artificial insemination ensure that, on most farms, high quality semen is delivered



with proper technique and timing to ensure conception. Attention to the sow at farrowing, and to the newborn pigs after birth, has reduced preweaning mortality to acceptable levels in most herds. Nevertheless, many well-managed herds produce less than 23 pigs per sow per year. This is commonly the result of liveborn littersize.

Liveborn pigs per litter is just over 11 in a large percentage of Ontario sow herds. Preweaning mortality is between 10 and 12% in these same herds. As a result, less than 10 pigs are weaned per litter and less than 23 pigs are weaned per sow per year. Compared to herds with over 25 pigs weaned per sow per year, the most consistent difference between low and high-producing herds is the number of pigs born alive.

The difference is seldom due to genetics or variations in the rations fed to the sows. However, there often is a difference in the amount of feed fed to lactating sows. The amount in question is relatively small, usually averaging between one-half and one kilogram of lactation diet per sow per day over a 21-day lactation. This small daily difference, barely noticeable on a per-scoop visual observation, can result in between 1 to 1.5 pigs born alive in the subsequent farrowing.

The reason that sows are slightly underfed is explained by the economics of human behaviour. This concept was recently demonstrated when applying the Kansas State recommendation to restrict baffle settings in nursery feeders so that only half the feeding pan was covered with feed at any time. This practice reduced feed wastage by 10% or more on some farms, saving the owner between $1.00 and $1.50 in feed costs per pig. However, when properly

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executed, 10 to 20% of nursery feeders would plug each week requiring readjustment. Therefore, the benefits of proper feeder adjustment were returned to the owner, while the costs in terms of additional labour, were borne by those feeding the nursery pigs. Over time, operators subconsciously loosened the baffles on nursery feeders to ensure that the feeders did not continue to plug. Baffle adjustment was set to maximize returns to labour rather than optimizing feed efficiency.

A similar situation occurs in relation to the feeding of lactating sows. If an effort is made to feed all sows to satiety, there will be some over-feeding of individual sows. As with proper adjustment of nursery feeders, the rewards of aggressively feeding sows accrue to the owner, while the unpleasant task of removing stale feed from a percentage of farrowing-crate feeders each week belongs to the employee. As a result, on many farms, lactating sows are fed as much feed as possible, but not so much that the frequency of events where feed is left in the feeder at the time of the next feeding is increased. A feeding protocol designed to ensure that lactation feeders never need cleaning can be a protocol that limit feeds a proportion of the lactating sows. It is a protocol that risks decreased liveborn numbers at subsequent farrowings

Suboptimal reproductive performance can be the result of as little as half a kilo a day of feed or as little as 250 grams per twice daily feeding. To remedy this situation, the connection between sow intake and subsequent liveborn littersize must be understood. Rewards must accrue to those who bare the costs of feeder clean-outs that invariably result from attempting to feed all sows to satiety. On today's sow farms, understanding the economics of human behaviour can be just as important to maximizing productivity as understanding the economics of hog production.

The "One Health" Approach: the Need for Veterinarians, Physicians and Public Health to Work Together

Kathy Zurbrigg, Veterinary Services Unit, OMAFRA

The incidence of emerging infectious diseases in human populations is increasing. These new infectious diseases over time cause a significant strain on global economies and public health resources. Studies indicate that between 60-75% of emerging infectious diseases are zoonoses. Because zoonoses affect humans and animals the medical and veterinary communities must work together on surveillance and prevention. Several organizations, including the Center for Disease Control (CDC), the American Veterinary Medical Association (AVMA) and the American Society for Microbiology (ASM), have endorsed a "one health" initiative. These groups are seeking ways to enhance communication and collaboration between physicians, veterinarians and public health agencies.

Working Together. Communication with colleagues and participation in surveillance systems can link individual cases from different medical professionals together, leading to the identification of an outbreak of disease.

ArboNET is a joint surveillance system run by the CDC. It tracks the West Nile virus activity in humans, mosquitoes, birds, horses and other animals. This system determines high risk areas, provides justification for continued mosquito control and supplies answers and new hypotheses regarding the disease. Veterinary and physician collaboration with

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surveillance systems such as ArboNET builds the relationships needed for further monitoring activities, such as jointly applied research in public health.

Physicians are often not comfortable discussing the role of animals in zoonotic disease transmission and control. At the same time, most patients don't discuss human health issues with their veterinarians. Therefore, it is crucial that collaboration between veterinarians and physicians occurs at both the individual and the population health levels.

The risk of contracting zoonotic diseases is increased in individuals with occupational exposure to animals. For example, swine producers may be exposed to influenza virus and employees of meat packing facilities may be exposed to *Salmonella, E. coli and Campylobacter.* Although veterinarians provide producers with information on human health risks if their livestock are diagnosed with a zoonotic disease, they should play a greater role in public health protection. For patients and the family of patients with occupational exposure to animals, physicians could request veterinarian contact information in the patient history. The veterinarian could then be contacted if the physician suspected a zoonotic disease. The veterinarian could provide an assessment of animal health and information on transmission risk factors.

Physicians and veterinarians are on the frontline for disease detection in their respective fields. At the population health level, veterinarians and physicians working together could provide increased vigilance for human and animal disease outbreaks, their causative factors and prophylactic measures. Communication with colleagues and participation in surveillance systems can link individual cases from different medical professionals together, leading to the identification of an outbreak of disease.

Physicians and nursing staff have been involved with public health syndromic surveillance projects for many years. Particular focus has been placed on monitoring emergency room visitors of major hospitals for common symptoms that may indicate a new infectious disease outbreak. The veterinary community should also contribute to the important discipline of surveillance. Human surveillance projects involve physicians, nursing and administrative staff working together. Most veterinary clinic-based surveillance involves only the attending veterinarian. Involving clinic employees, such as veterinary technicians and administrative staff, with animal health surveillance could ease the veterinarian's workload and facilitate the accurate and effective reporting of disease syndromes in domestic animals. Once the veterinary community establishes effective surveillance at the clinic level, collaborative analyses involving cooperating clinics becomes possible.

A clinic-based disease surveillance program would collect data on the symptoms displayed by domestic livestock when seen by a veterinarian (e.g., coughing pigs, staggering horses). This information should be sent in for analysis on a weekly basis to be timely. Data collection forms (either paper or electronic) could be designed specifically for each participating clinic or veterinarian. These forms would include the symptom information as well as any other data the clinic would like to document for their own records, billing or interest. It could be the technician's responsibility to forward only the symptom information to the surveillance project. If a cluster of symptoms are found, the clinics involved would be contacted to advise on the situation. Currently, OMAFRA and the University of Guelph are testing a similar system with swine veterinarians in Ontario.

Clinics interested in participating in a clinic-based surveillance system that involves veterinarians and their staff, for swine or other livestock species, should contact Kathy Zurbrigg at: kathy.zurbrigg@ontario.ca or (519) 846-3418.

Body Condition Scoring for Dairy and Beef Cattle

Enclosed with this issue of Ceptor is a handout published by the *Ontario Farm Animal Council.*

It is available from the OFAC office at (519) 837-1326 or can be downloaded from their website at *www.ofac.org/issues/animal_resources.php#cattle*

Continuing Education/Coming Events

June 13 & 14, 2008	Ontario Hoof Trimmers Guild Annual Meeting, Ramada Inn, Guelph, Ontario. *www.ontariohooftrimmersguild.com*
June 22-26, 2008	20th Congress of the International Pig Veterinary Society, International Convention Centre Durban, South Africa. *www.ipvs2008.org.za*
July 7-11, 2008	American Dairy Science Association and American Society of Animal Science Annual Meeting, Indianapolis, Indiana *adsa.asas.org/meetings/2008*
July 14-16, 2008	First North American Welfare and Epidemiology Conference, Gateway Hotel and Conference Center, Ames, Iowa. *www.ucs.iastate.edu/mnet/welfare/home.html*
July 27-29, 2008	Practice Management Seminar and Focus Meeting—Focus on First Year of Life, American Association of Equine Practitioners, Hilton Austin, Austin, Texas. *www.aaep.org*
August 12 & 13, 2008	National Mastitis Council Regional Meeting, Theme: Heat, Humidity and High Quality Milk—Tackling the Summertime Blues, Hotel Sierra (formerly the Regency Suites), Green Bay, Wisconsin. *www.nmconline.org/meetings.html*
August 14, 2008	George A. Young Swine Health and Management Conference, Marina Inn, South Sioux City, Nebraska. *http://georgeyoungswineconference.unl.edu*
September 20-23, 2008	Allen D. Leman Swine Conference, River Centre Conference Facility, Saint Paul, Minnesota. *www.cvm.umn.edu/outreach/events/adl/* E-mail: vop@umn.edu
September 25-27, 2008	American Association of Bovine Practitioners 41st Annual Convention, Charlotte, North Carolina. *www.aabp.org*
October 16-18, 2008	American Embryo Transfer Association (AETA) and Canadian Embryo Transfer Association (CETA/ACTE) Joint Scientific Convention, The Westin Crown Center Hotel, Kansas City, Missouri. *www.ceta.ca/08convention.htm*
November 7 & 8, 2008	Dairy Cattle Reproduction Council Convention, Omaha Convention Center, Omaha, Nebraska. *www.dcrcouncil.org*
November 16-19, 2008	Fifteenth DISCOVER Conference on Food Animal Agriculture - Biology of the Calf: Birth to 4 Months, sponsored by the American Dairy Science Association and in Cooperation with Virginia Cooperative Extension, Hotel Roanoke and Conference Center, Roanoke, Virginia. *www.adsa.org/discover/15thDiscover_2008.htm*
December 5-6, 2008	2008 International PRRS Symposium, Downtown Marriott, Chicago, Illinois. *www.prrssymposium.org*
December 6-10, 2008	American Association of Equine Practitioners 54th Annual Convention, San Diego Convention Center, San Diego, California. *www.aaep.org/convention.htm*
May 31-June 4 2009	VIIIth International Conference on Pig Reproduction, Banff Centre, Banff, Alberta. *www.icpr2009.com*

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